National Climatic Data Center

DATA DOCUMENTATION

FOR

DATA SETs 6160-6165
(DSI-6160)-(DSI-6165)

Reanalysis Data Sets

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1. Abstract: Until recently, the meteorological community has had to use analyses that supported the real-time weather forecasting. These analyses are very inhomogeneous in time as there have been big improvements in the data assimilation systems. This played havoc with climate monitoring as these improvements were often produced changes in the apparent "climate". Even fundamental quantities such as the strength of the Hadley cell have changed over the years as a result of the changes in the data assimilation systems.

The NCEP/NCAR 40-year reanalysis uses a frozen state-of-the-art global data assimilation system, and a database as complete as possible. The data assimilation and the model used are identical to the global system implemented operationally at NCEP on 11 January 1995, except that the horizontal resolution is T62 (about 210 km). The database has been enhanced with many sources of observations not available in real time for operations, provided by different countries and organizations. The system has been designed with advanced quality control and monitoring components, and can produce one month of reanalysis per day on a CRAY YMP/8 supercomputer.

The quality and utility of the re-analyses should be superior to NCEP's original analyses because

- a state-of-the-art data assimilation is used
- more observations are used
- quality control has been improved
- the model/data assimilation procedure will remain essentially unchanged during the project
- many more fields are being saved (ex. potential vorticity on isentropic surfaces, diabatic heating)
- global (some older analyses were hemispheric)
- better vertical resolution (stratosphere)

Most of the data were written in GRIB which can be quite easy to read. See:

http://wesley.wwb.noaa.gov/types_data.html

2. Element Names and Definitions:

Pressure Level Data - The fields include: horizontal winds, omega (dP/dt), geopotential height, specific/relative humidity, absolute vorticity and divergence, The data are on standard pressure levels every 6 hours.

Isentropic Level Data - Data on isentropic surfaces include: horizontal winds, mass-weighted horizontal winds, omega (dP/dt), temperature, potential vorticity, relative humidity, Montgomery stream function, Brunt-Vaisala freq. squared, and potential temperature at the surface. This data is available on 10 isentropic surfaces every 6 hours.

Sigma Level Data: Gridded - Gridded data on sigma surfaces include: rel. vorticity, divergence, temperature, specific humidity, horizontal winds, surface pressure, geopotential height.

Sigma Level Data: Spectral - The atmospheric analysis is available as a spectral sigma file. This is the only file with full precision data. For most problems, the truncation used by the GRIB files are reasonable. (For example, the temperatures are stored to the nearest 1/10 of a degree which is better than your average thermometer reading.) However, those needing higher vertical resolution should go to the original spectral sigma files.

Diabatic Heating - One huge database is the diabatic heating and sub-grid momentum fluxes on the 28 sigma levels every 6 hours. One reason this set of data is so huge is that the diabatic heating is divided into its various components such as long wave heating.

Radiation Related Quantities - Quantities include: LW/SW cloud forcing, clear/cloudy, LW/SW, upward/downward fluxes.

Clouds & Precipitation - Fields include: total cloud cover, convective and total precipitation.

Misc. Fields - The other fields include: surface wind stress, latent/sensible heat flux, soil temperature/moisture, gravity wave drag, SST, 2m temperature, 2m humidity, 10m winds, runoff, mean sea level pressure, surface pressure, and snow.

Not quite Analyses - Other Reanalysis products include the first guess, hindcast forecasts (the skill of the forecasts give some idea about the quality of the analyses), BUFR data (the raw data from aircraft, rawinsondes, satellite, etc), optimal averages, statistics of the raw data utilization, and even a GCM simulation (sea-ice, SST boundary conditions).

NCEP/NCAR Reanalysis Comprehensive Output Variables

The output variables are classified into four categories, depending on the relative influence of the observational data and the model on the gridded variable. An **A indicates** that the analysis variable is strongly influenced by observed data, and hence it is in the most reliable class (e.g., upper air temperature and wind). The designation **B indicates** that, although there are observational data that directly affect the value of the variable, the model also has a very strong influence on the analysis value (e.g., humidity, and surface temperature). The letter **C indicates** that there are no observations directly affecting the variable, so it is derived solely from the model fields forced by the data assimilation to remain close to atmospheric equalibrium under current observations (e.g., clouds and precipitation). Finally, the letter **D represents** a field that is fixed from climatological values, and does not depend on the model (e.g., vegetation index, plant resistance, land-sea mask). Although the classification of variables is necessarily somewhat subjective, the user should exercise caution in interpreting the results of the reanalysis, especially for variables classified in categories B and C. In addition to this rule of thumb, the user should keep in mind that quadratic variables (e.g., kinetic energy, transport of water vapor) are in general less reliable than the components from which they were computed.

- Standard output

Pressure: Pressure coordinate output

... Regular latitude-longitude grid (2.5o x 2.5o)
... All fields are instantaneous values at a given time

A Geopotential height (gpm) at 17 levels
A u-wind (m/s) 17 levels
A v-wind (m/s) 17 levels
A Temperature (K) 17 levels

:

B Pressure vertical velocity (Pa/s) 12 levels
B Relative humidity (%) 8 levels
A Absolute vorticity (/s) 17 levels
A u-wind of the lowest 30 hPa layer (m/s)
A v-wind of the lowest 30 hPa layer (m/s)
B Temperature of the lowest 30 hPa layer (K)
B Relative humidity of the lowest 30 hPa (%)
B Pressure at the surface (Pa)
B Precipitable water (kg/m2)
B Relative humidity of the total atmospheric column (%)
A Temperature at the tropopause (K)
A Pressure at the tropopause (Pa)
A u-wind at the tropopause (m/s)
A v-wind at the tropopause (m/s)
A Vertical speed shear at the tropopause (1/s)
B Surface lifted index (K)
B "Best" (4-layer) lifted index (K)
A Temperature at the maximum wind level (K)
A Pressure at the maximum wind level (Pa)
A u-wind at the maximum wind level (m/s)
A v-wind at the maximum wind level (m/s)
D Geopotential height at the surface (gpm)
A Pressure reduced to MSL (Pa)
B Relative humidity in 3 sigma layers:

0.44-0.72(%)
0.72-0.94(%)
0.44-1.0(%)

B Potential temperature at the lowest sigma level (K)
B Temperature at the lowest sigma level (K)
B Pressure vertical velocity at the lowest sigma level (Pa/s)
B Relative humidity at the lowest sigma level (%)
B u-wind at the lowest sigma level (m/s)
B v-wind at the lowest sigma level (m/s)

Grb2d...2-dimensional diagnostic file

C Cloud forcing net longwave flux at the top of atmosphere (W/m2)
C Cloud forcing net longwave flux at the surface (W/m2)
C Cloud forcing net longwave flux for total atmospheric column(W/m2)
C Cloud forcing net solar flux at the top of the atmosphere (W/m2)
C Cloud forcing net solar flux at the surface (W/m2)
C Cloud forcing net solar flux for total atmospheric column (W/m2)
C Convective precipitation rate (kg/m2/s)
C Clear sky downward longwave flux at the surface (W/m2)
C Clear sky downward solar flux at the surface (W/m2)
C Clear sky upward longwave flux at the top of the atmosphere(W/m2)
C Clear sky upward solar flux at the top of atmosphere (W/m2)
C Clear sky upward solar flux at the surface (W/m2)
C Cloud work function (J/Kg)
C Downward longwave radiation flux at the surface (W/m2)
C Downward solar radiation flux at the top of the atmosphere (W/m2)
C Downward solar radiation flux at the surface (W/m2)
C Ground heat flux (W/m2)
D Ice concentration (ice=1;no ice=0) (1/0)
D Land-sea mask (1=land;0=sea) (integer)

```
C Latent heat flux (W/m2)
C Near IR beam downward solar flux at the surface (W/m2)
C Near IR diffuse downward solar flux at the surface (W/m2)
C Potential evaporation rate (w/m2)
C Precipitation rate (kg/m2/s)
C Pressure at high cloud top (Pa)
C Pressure at high cloud base (Pa)
C Pressure at middle cloud top (Pa)
C Pressure at middle cloud base (Pa)
C Pressure at low cloud top (Pa)
C Pressure at low cloud base (Pa)
C Pressure at the surface (Pa)
C Run off (kg/m2 per 6 hour interval)
D Surface roughness (m)
C Nearby model level of high cloud top (integer)
C Nearby model level of high cloud base (integer)
C Nearby model level of middle cloud top (integer)
C Nearby model level of middle cloud base (integer)
C Nearby model level of low cloud top (integer)
C Nearby model level of low cloud base (integer)
C Sensible heat flux (W/m**2)
C Volumetric soil moisture content (fraction) (2 layers)
B Specific humidity at 2m (kg/kg)
C Total cloud cover of high cloud layer (%)
C Total cloud cover of middle cloud layer (%)
C Total cloud cover of low cloud layer (%)
B Maximum temperature at 2m (K)
B Minimum temperature at 2m (K)
AB Temperature at the surface (skin temperature) (K)
C Temperature of the soil layer (3 layers) (K)
B Temperature at 2m (K)
C Temperature of high cloud top (K)
C Temperature of low cloud top (K)
C Temperature of middle cloud top (K)
C Zonal gravity wave stress (N/m2)
B Zonal component of momentum flux (N/m2)
B u-wind at 10m (m/s)
C Upward longwave radiation flux at the top of the atmosphere(W/m2)
C Upward longwave radiation flux at the surface (W/m2)
C Upward solar radiation flux at the top of the atmosphere (W/m2)
C Upward solar radiation flux at the surface (W/m2)
C Meridional gravity wave stress (N/m2)
C Visible beam downward solar flux at the surface (W/m2)
C Visible diffuse downward solar flux at the surface (W/m2)
C Meridional component of momentum flux (N/m2)
B v-wind at 10m (m/s)
C Water equivalent of accum. snow depth (kg/m2)
```

Grb3d...3-dimensional diagnostic file

```
... Gaussian grid (192 x 94) on 28 model levels
... All fields are average of 6 hour integration starting from a given
    time

C Deep convective heating rate (K/s)
C Deep convective moistening rate (kg/kg/s)
C Large scale condensation heating rate (K/s)
```

C Longwave radiative heating rate (K/s)
C Shallow convective heating rate (K/s)
C Shallow convective moistening rate (kg/kg/s)
C Solar radiative heating rate (K/s)
C Vertical diffusion heating rate (K/s)
C Vertical diffusion moistening rate (kg/kg/s)
C Vertical diffusion zonal accel. (m/s/s)
C Vertical diffusion meridional accel. (m/s/s)

Sigma

... Gaussian grid (192 x 94) on 28 model levels or surface
... All fields are instantaneous values at a specified time

A Relative vorticity (28 levels) (/s)
B Divergence (28 levels) (/s)
A Temperature (28 levels) (K)
B Specific humidity (28 levels) (kg/kg)
A x-gradient of log pressure (surface) (1/m)
A y-gradient of log pressure (surface) (1/m)
A u-wind (28 levels) (m/s)
A v-wind (28 levels) (m/s)
A Pressure (surface) (Pa)
A Geopotential height (surface) (gpm)
A x-gradient of height (surface) (m/m)
A y-gradient of height (surface) (m/m)

Isentropic coordinate output

... Gaussian grid (192 x 94) most on 10 isentropic levels
... All fields are instantaneous values at a specified time

A Potential temperature (surface) (K)
A Temperature (K)
A u-wind (m/s)
A v-wind (m/s)
B Pressure vertical velocity (Pa/s)
B Relative humidity (%)
A Montgomery stream function (m2/s2)
B Brunt-Vaisala frequency squared (1/s2)
B Potential vorticity (m2/s/kg)

- Other non-GRIB output files

Zonal diagnostic file (binary)

... Average over 90S-60S, 60S-30S, 30S-30N, 30N-60N, 60N-90N and global
... Unmarked fields are instantaneous values at a given time
... (Av) indicates average during the 6 hour integration

A u component of wind (m/s)	at 28 model levels
A v component of wind (m/s)	at 28 model levels
A virtual temperature (K)	at 28 model levels
B specific humidity (g/g)	at 28 model levels
B squared vorticity (1/s2)	at 28 model levels
C squared divergence (1/s2)	at 28 model levels
B pressure vertical velocity (Pa/s)	at 28 model levels

```
A temperature (K)                                  at 28 model levels
B relative humidity (%)                            at 28 model levels
B kinetic energy (m2/s2)                           at 28 model levels
C convective heating (K/s)                         at 28 model levels (Av)
C large scale heating (K/s)                        at 28 model levels (Av)
C shallow convection heating (K/s)                 at 28 model levels (Av)
C vertical diffusion heating (K/s)                 at 28 model levels (Av)
C convective moistening (g/g/s)                    at 28 model levels (Av)

C shallow convection moistening (g/g/s)            at 28 model levels (Av)
C vertical diffusion moistening (g/g/s)            at 28 model levels (Av)
C zonal accel by vertical diffusion (m/s2)         at 28 model levels (Av)
C meridional accel by vertical diffusion (m/s2)    at 28 model levels
C short wave radiation heating (K/s)               at 28 model levels (Av)
C long wave radiation heating (K/s)                at 28 model levels (Av)
C total precipitation (Kg/m2) (Av)
C convective precipitation (Kg/m2) (Av)
C sensible heat flux (w/m2) (Av)
C latent heat flux (w/m2) (Av)
B zonal stress (dyn/m2) (Av)
B meridional stress (dyn/m2) (Av)
C rain area coverage (%)
C convective rain area coverage (%)
B surface pressure (hPa)
C surface skin temperature (K)
C soil wetness (cm)
C snow depth (m)
C 10 cm deep soil temperature (K)
C 50 cm deep soil temperature (K)
D 500 cm deep soil temperature (K)
C surface net short wave flux (W/m2) (Av)
C surface net long wave flux (W/m2) (Av)
B relative humidity                          at the lowest model level (%)
B virtual temp                               at the lowest model level (K)
B temperature                                at the lowest model level (K)
B specific humidity                          at the lowest model level (K)
D surface roughness (m)
D land sea sea-ice mask (int)
C zonal accel by gravity wave drag (m/s2) (Av)
C meridional accel by gravity wave (m/s2)  (Av)
B surface torque (g/m2/s2) (Av)
C gravity wave drag torque (g/m2/s2)  (Av)
B mountain torque (g/m2/s2) (Av)
B total angular momentum (m2/s)
B planetary angular momentum (m2/s)
```

Output levels

Standard Pressure levels (hPa):

1000,925,850,700,600,500,400,300,250,100,150,100,70,50,30,20,10

Isentropic surfaces (degrees K):

650,550,450,400,350,330,315,300,290,280,270

Sigma levels:

0.9950 0.9821 0.9644 0.9425 0.9159 0.8838 0.8458 0.8014
0.7508 0.6943 0.6329 0.5681 0.5017 0.4357 0.3720 0.3125
0.2582 0.2101 0.1682 0.1326 0.1028 0.0782 0.0580 0.0418
0.0288 0.0183 0.0101 0.0027

3. **Start Date**: 19580101

4. **Stop Date**: On going. Data will be made available by month as soon as it is processed.

5. **Coverage**: Global Coverage

a. Southernmost Latitude: 90S
b. Northernmost Latitude: 90N
c. Westernmost Longitude: 180W
d. Easternmost Longitude: 180E

6. **How to Order Data**:

Ask NCDC's Climate Services about the cost of obtaining this data set.
Phone: 828-271-4800
FAX: 828-271-4876
e-mail: NCDC.Orders@noaa.gov

7. **Archiving Data Center**:

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
Phone: (828) 271-4800.

8. **Technical Contact**:

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
Phone: (828) 271-4800.

9. **Known Uncorrected Problems**: please refer to:

http://www.cdc.noaa.gov/cdc/reanalysis/problems.shtml

10. **Quality Statement**: NCDC performs no additional quality assessment of the data supplied. The quality and utility of the re-analyses should be superior to NCEP's original analyses because

- a state-of-the-art data assimilation is used
- more observations are used
- quality control has been improved
- the model/data assimilation procedure will remain essentially unchanged during the project
- many more fields are being saved (ex. potential vorticity on isentropic surfaces, diabatic heating)

- global (some older analyses were hemispheric)
- better vertical resolution (stratosphere)

11. Essential Companion Datasets: None.

12. References:

"The NCEP/NCAR 40-Year Reanalysis Project", Bulletin of the American Meteorological Society, March 1996

http://www.cdc.noaa.gov/cdc/reanalysis

http://wesley.wwb.noaa.gov/reanlysis.html

http://wesley.wwb.noaa.gov/types_data.html

http://www.cdc.noaa.gov/cdc/reanalysis/problems.shtml

Appendix A

DSI-6160

Surface Flux Data

Archive parameters: File names are composed of variable abbreviations, level, and year:

(variable).(level).gauss.(year).nc

Variables on or near the surface:	File	Units	Least Sig. Digit
These variables (air.sfc - weasd) are 6 hour forecasts.			
Air Temperature	air.sfc	degK	0.1
Air Temperature at 2 meters	air.2m	degK	0.1
Ice concentration	icec.sfc	(0 or 1)	1.
Potential evaporation rate	pevpr.sfc	W/m^2	1.
Pressure	pres.sfc	Pascals	0.
Water runoff	runof.sfc	Kg/m^2	0.1
Surface roughness	sfcr.sfc	m	0.00001
Specific humidity at 2 meters	shum.2m	kg/kg	0.0001
Volumetric soil moisture (0-10cm)	soilw.0-10cm	fraction	0.001
Volumetric soil moisture (10-200cm)	soilw.10-200cm	fraction	0.001
Maximum temperature at 2m layer	tmax.2m	degK	0.1
Minimum temperature at 2m layer	tmin.2m	degK	0.1
Temperature of 0-10cm layer	tmp.0-10cm	degK	0.1
Temperature of 10-200cm layer	tmp.10-200cm	degK	0.1
Temperature at 300cm	tmp.300cm	degK	0.1
U-wind at 10 m	uwnd.10m	m/s	0.1
V-wind at 10 m	vwnd.10m	m/s	0.1
Water equiv. of accum. snow depth	weasd.sfc	kg/m^2	1.
These variables (cfnlf.sfc - vgwd) are 6 hour averages starting at the reference time.			
Cloud forcing net longwave flux	cfnlf.sfc	W/m^2	1.
Cloud forcing net solar flux	cfnsf.sfc	W/m^2	1.
Convective precipitation rate	cprat.sfc	Kg/m^2/s	0.000001
Clear sky downward longwave flux	csdlf.sfc	W/m^2	1.
Clear sky downward solar flux	csdsf.sfc	W/m^2	1.
Downward longwave radiation flux	dlwrf.sfc	W/m^2	1.
Downward solar radiation flux	dswrf.sfc	W/m^2	1.
Ground heat flux	gflux.sfc	W/m^2	1.
Latent heat net flux	lhtfl.sfc	W/m^2	1.
Near IR beam downward solar flux	nbdsf.sfc	W/m^2	1.
Near IR diffuse downward solar flux	nddsf.sfc	W/m^2	1.
Net longwave radiation	nlwrs.sfc	W/m^2	1.
Net shortwave radiation	nswrs.sfc	W/m^2	1.
Precipitation rate	prate.sfc	Kg/m^2/s	0.000001
Sensible heat net flux	shtfl.sfc	W/m^2	1.
Zonal component of momentum flux	uflx.sfc	N/m^2	0.001

Zonal gravity wave stress	ugwd.sfc	N/m^2	0.001
Upward longwave radiation flux	ulwrf.sfc	W/m^2	1.
Upward solar radiation flux	uswrf.sfc	W/m^2	1.
Visible beam downward solar flux	vbdsf.sfc	W/m^2	1.
Visible diffuse downward solar flux	vddsf.sfc	W/m^2	1.
Meridional component of momentum flux	vflx.sfc	N/m^2	0.001
Meridional gravity wave stress	vgwd.sfc	N/m^2	0.001
Land-sea mask (time invariant) *	land.sfc	(0 or 1)	1.

* = no year in file name

Note:

The air.sfc files contain skin temperature as described in the March, 1996 BAMS article. As such, over land and sea ice, the temperature is a prognostic variable. Over open water, the skin temperature is fixed at its initial value; i.e., the Reynolds SST as seen by the model. The Reynolds' SST analyses were done weekly and the reconstructed SST done monthly. The analyses were linearly interpolated to daily values which were used for all four analyses.

The following variables are 6 hour forecasts values valid at the reference time:

air.sfc, air.2m, icec.sfc, pres.sfc, runof.sfc, sfcr.sfc, shum.2m, soilw.0-10cm, soilw.10-200cm, tmax.2m, tmin.2m, tmp.0-10cm, tmp.10-200cm, tmp.300cm, uwnd.10m, vwnd.10m, weasd.sfc, land.sfc

The following variables are six hour averages for the period of the reference time plus six hours:

cfnlf.sfc, cfnsf.sfc, cprat.sfc, csdlf.sfc, csdsf.sfc, dlwrf.sfc, dswrf.sfc, gflux.sfc, lhtfl.sfc, nbdsf.sfc, nddsf.sfc, prate.sfc, shtfl.sfc, uflx.sfc, ugwd.sfc, ulwrf.sfc, uswrf.sfc, vbdsf.sfc, vddsf.sfc, vflx.sfc, vgwd.sfc, nlwrs.sfc, nswrs.sfc

Spatial coverage:

* T62 Gaussian grid with 192x94 points
* 88.542N-88.542S, 0E-358.125E

Temporal coverage:

* 1/1/1958 - 12/31/1997 with output every 6 hours
* Data for the current year (1998) from the CDAS program is being made available along with the historical data. Files for 1998 contain as many months as are currently available. All variables are available except net longwave radiation and net shortwave radiation.

Levels:

* Surface or near the surface

Missing data: None

Data set format and size:

:

* All data are stored in netCDF files
* The data are divided by variable and year into separate files
* There are 1,679 files currently
* Files are 52 Mbytes per variable per year
* Current total of 88.5 Gbytes for 4xDaily and 6.3 Gbytes for daily averages

Availability and usage restrictions:

* Daily averages are available by anonymous FTP from ftp.cdc.noaa.gov in . /Datasets/ncep.reanalysis.dailyavgs/surface_gauss.
* There are no usage restrictions.

Appendix B

DSI-6161

T62 Spectral Coefficients

Archive parameters: File names are composed of variable abbreviations and year:

(variable).spec.(year).nc

Variables as spectral coeffs.:	File	Units	Least Sig. Digit
Divergence	div	1./s	0.1
Orography	orog	m	n/a
Natural Log of Pressure	pres	nlog(centibars)	1.0
Specific Humidity	shum	kg/kg	0.0001
Virtual Air Temperature	vair	degK	1.0
Vorticity	vort	1./s	0.1

Note:

These variables are instantaneous values at the reference time.

Spatial coverage:

* T62 Spectral Coefficients

Temporal coverage:

* 1/1/1958 - 12/31/1997 with output every 6 hours

Levels:

* 28 Sigma levels: 0.995, 0.9821, 0.9644, 0.9425, 0.9159, 0.8838, 0.8458, 0.8014, 0.7508, 0.6943, 0.6329, 0.5681, 0.5017, 0.4357, 0.372, 0.3125, 0.2582, 0.2101, 0.1682, 0.1326, 0.1028, 0.0782, 0.058, 0.0418, 0.0288, 0.0183, 0.0101, 0.0027

* Some variables not defined at all levels.

Missing data: None

Data set format and size:

* All data are stored in netCDF files
* The data are divided by variable and year into separate files
* There are 196 files currently
* Sizes range from 17 Kbytes to 331 Mbytes per variable per year
* Current total of 52 Gbytes for 4xDaily

Availability and usage restrictions:

* There are no daily averages for the spectral data available from CDC.
* The 4x daily data files available by anonymous FTP from ftp.cdc.noaa.gov in /Datasets/nmc.reanalysis/spectral.

:

* There are no usage restrictions.

Appendix C

DSI-6162

Surface Data

Archive parameters: File names are composed of variable abbreviations, level, and year:

(variable).(level).(year).nc

Variables on or near the surface:	File	Units	Least Sig. Digit
Air Temperature	air.sig995	degK	0.1
Surface lifted index	lftx.sfc	degK	0.1
Best (4-layer) lifted index	lftx4.sfc	degK	0.1
Omega (vertical velocity)	omega.sig995	Pascal/s	0.001
Potential temperature	pottmp.sig995	degK	0.1
Precipitable water	pr_wtr.eatm	kg/m^2	0.1
Pressure	pres.sfc	Pascals	10.0
Relative humidity	rhum.sig995	%	1.0
Sea level pressure	slp	Pascals	10.0
U-wind	uwnd.sig995	m/s	0.1
V-wind	vwnd.sig995	m/s	0.1
Geopotential hgt (time invariant) *	hgt.sfc	m	1.0
Land-sea mask (time invariant) **	land		1.0

* = no year in file name
** = no year or level in filename

Note:

These variables are instantaneous values at the reference time.

Spatial coverage:

* 2.5-degree latitude x 2.5-degree longitude global grid with 144x73 points
* 90N-90S, 0E-357.5E

Temporal coverage:

* 1/1/1958 - 12/31/1997 with output every 6 hours
* Data for the current year (1998) from the CDAS program is being made available along with the historical data. Files for 1998 contain as many months as are currently available. All variables are available except precipitable water.

Levels:

* Surface or near the surface (.995 sigma level)
* Also, precipitable water is included here, because it is a 3-D file on a 2.5 degree grid, but it is not a surface value, but rather for the entire atmospheric column

Missing data: None

Data set format and size:

* All data are stored in netCDF files
* The data are divided by variable and year into separate files
* There are 441 files currently
* Files are 30 Mbytes per variable per year
* Current total of 13.4 Gbytes for 4xDaily and 3.4 Gbytes for daily averages

Availability and usage restrictions:

* Daily averages are available by anonymous FTP from ftp.cdc.noaa.gov in /Datasets/ncep.reanalysis.dailyavgs/surface.
* There are no usage restrictions.

Appendix E

DSI-6164

Pressure Level Data

Archive parameters: File names are composed of variable abbreviations and year: (variable).(year).nc

Variables on pressure levels:	File	Units	Least Sig. Digit
Air temperature	air	degK	0.1
Geopotential height	hgt	m	1.
Relative humidity	rhum	%	1.
Specific humidity	shum	kg/kg	0.00001
Omega (vertical velocity)	omega	Pascal/s	0.001
U-wind	uwnd	m/s	0.1
V-wind	vwnd	m/s	0.1

Note: These variables are instantaneous values at the reference time.

Spatial coverage:

* 2.5-degree latitude x 2.5-degree longitude global grid with 144x73 points.
* 90N-90S, 0E-357.5E

Temporal coverage:

* 1/1/1958 - 12/31/1997 with output every 6 hours
* Data for the current year (1998) from the CDAS program is being made available along with the historical data. Files for 1998 contain as many months as are currently available.

Levels:

* 17 pressure levels (hPa): 1000, 925, 850, 700, 600, 500, 400, 300, 250, 200, 150, 100, 70, 50, 30, 20, 10
* some variables not defined at all levels

Missing data: None

Data set format and size:

* All data are stored in netCDF files
* The data are divided by variable and year into separate files
* There are 279 files currently
* Sizes range from 245 Mbytes to 521 Mbytes per variable per year
* Current total of 118 Gbytes for 4xDaily and 29.4 Gbytes for daily averages

Availability and usage restrictions:

* Daily averages are available by anonymous FTP from ftp.cdc.noaa.gov in /Datasets/ncep.reanalysis.dailyavgs/pressure.
* No usage restrictions.

Appendix F

DSI-6165

Pressure Level Data - 6 hour forecast

Archive parameters: File names are composed of variable abbreviations and year: (variable).(year).nc

Variables on pressure levels:	File	Units	Least Sig. Digit
Air temperature	air	degK	0.1
Geopotential height	hgt	m	1.
Relative humidity	rhum	%	1.
Specific humidity	shum	kg/kg	0.00001
Omega (vertical velocity)	omega	Pascal/s	0.001
U-wind	uwnd	m/s	0.1
V-wind	vwnd	m/s	0.1

Note: These variables are instantaneous values at the reference time.

Spatial coverage:

* 2.5-degree latitude x 2.5-degree longitude global grid with 144x73 points.
* 90N-90S, 0E-357.5E

Temporal coverage:

* 1/1/1958 - 12/31/1997 with output every 6 hours
* Data for the current year (1998) from the CDAS program is being made available along with the historical data. Files for 1998 contain as many months as are currently available.

Levels:

* 17 pressure levels (hPa): 1000, 925, 850, 700, 600, 500, 400, 300, 250, 200, 150, 100, 70, 50, 30, 20, 10
* some variables not defined at all levels

Missing data: None

Data set format and size:

* All data are stored in netCDF files
* The data are divided by variable and year into separate files
* There are 279 files currently
* Sizes range from 245 Mbytes to 521 Mbytes per variable per year
* Current total of 118 Gbytes for 4xDaily and 29.4 Gbytes for daily averages

Availability and usage restrictions:

* Daily averages are available by anonymous FTP from ftp.cdc.noaa.gov in /Datasets/ncep.reanalysis.dailyavgs/pressure.
* There are No usage restrictions.